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AN ADDITIONAL WORD AS TO THE TREATMENT OF EXOPHORIA.

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I HAVE received such a large number of letters of inquiry as regards the little suggestion *in rê* the treatment of exophoria made in THE MEDICAL NEWS of October 14th, that it has become almost impossible to answer each inquiry individually. I should like to add a word or two in order to classify and explain several points that seem to have been left in some doubt:

1. The treatment of insufficiencies by means of weak prisms "to strengthen the muscles," seems to have been devised and recommended by Dr. Dyer so far back as 1865, and in this field of work that veteran clinician and honored teacher, Dr. Noyes, of New York (and possibly many others), has long carried out this plan, and other excellent modifications of the plan, in his practice. When I wrote my article, as explained at the time, I had had no opportunity to look up the literature of the subject, and did not know of the work of Drs. Dyer and Noyes, nor was I aware of the excellent studies and methods suggested by my friend Dr. Savage, of Nashville, Tenn. To these and any other workers in "prism-gymnastics" I would gladly acknowledge all precedence and give all honor so far as pertains to muscular gymnastic exercises of the eye. This in answer to two correspondents who thought I had not sufficiently done so. But that even these methods of treatment have proved unsatisfactory is evident from

the fact that they have not become routine with the general profession, and that in several of the best and most recent books on ophthalmology the method is not even mentioned. (I was, however, in error when I said that the fine treatise of my friend Dr. de Schweinitz had also omitted mention of it, my error being due only to its omission from the index.)

So much for my sins of omission!

2. But it remains to emphasize my contention that I do not aim to "strengthen the muscles," and that with "muscular gymnastics," as such, my plan has nothing in common except the mere use of prisms—very strong prisms, however, instead of weak ones. If the trouble lay in the peripheral mechanism, then tenotomy or gymnastic exercises with weak prisms would be the proper treatment, and the use of such strong prisms as I advise would be the height of dangerous folly. It seems to me that all previous treatments of heterophoria have looked solely to the muscles, the peripheral condition, as the *fons et origo mali.* Surely all tenotomization proceeds on that assumption, and I as certainly judge that all previous suggestions of "prism-gymnastics" likewise are founded upon the same conception.

3. But it appears to me beyond question that in the vast majority of cases of exophoria, if not in all, the seat of the abnormality is purely, at least primarily, and always principally, central, and innervational. It is not at all a question of tendon-insertions or of muscular strengths. A few of many reasons for so thinking are these:

a. In convergence-adduction, the "muscles" overcoming the maximum of prisms, bases out, that is possible, either internal rectus may be made to greatly increase its contractile power by simply carrying the object to the left or to the right side of the field.

b. Extreme adduction (twenty feet) of exophoric eyes may be doubled, often trebled, in a minute or two by

the device of carrying slowly the object gazed at, with weighted convergence-stimulus from the near to the distant point. If, as I said, one can lift with his arms only too pounds, one cannot lift 400 or 600 pounds in a minute by any analogous change of the method of lifting.

c. The extreme of primary adduction-power, and even the double of this extreme, may be held continuously for several minutes, even a half-hour or more—I don't know how much longer. The extreme lift of other bodily muscles can only be held an instant, and not only this, but constant and uninterrupted tension or contraction of such muscles in lifting even very small weights is impossible.

d. Besides all this, such constant tension, when solely muscular, is painful, even agonizing, if demanded by the will or by necessity. In the case of exophoria, the extreme of prisms, and even the double of the extreme, bases out, that can at first be held without diplopia, is in a minute or two continuously held without the faintest suggestion of pain or even of discomfort.

e. Muscular tissue, as such, cannot be made to double or treble its volume or its strength in a few hours or days, or even in a few weeks, but such increase of ocular adduction-power I see many times every day.

There are many other such considerations, too numerous to mention, all running to prove the same conclusions.

4. If, therefore, the seat of the difficulty lies in the innervational centers and coördinations, the treatment by tenotomy, or by gymnastic exercises (with weak prisms), seems to fall to the ground. We must instead seek to normalize innervation, leaving the muscles and tendons entirely out of the count. In accordance with this I have sought to break up the bad habit of exophorial innervation, to reëstablish normality in an erroneous nervous coördination, to heighten convergence-stimulus, and to carry this increased stimulus as well as the naturally

heightened stimulus of convergence at near range, into distant and all-around seeing.

5. The method I suggest for effecting this normalization of innervation and coördination in exophoria is by what I have called "the weighted convergence-stimulus carried from the near-point to the distant-point." In the great majority of cases of subnormal adducting power, I find that the "weighting" or "handicapping" by prisms, bases out, is at first about double the primary twenty-foot adduction-power. That is, if the patient has only 10° of such adduction-power, we may at first safely give 20° prisms (total) as the handicap, then slowly carry the object gazed at fixedly and continuously from the near-point to the distant-point. This is to be repeated until the eyes with 20° prisms can hold objects all about the room easily. The repetition is to continue several times daily until this increased adduction-power *is habitual*, and until no diplopia is produced on first adjusting the prism-fronts, (or, better, prism-spectacles) and looking at distant objects immediately, and without the device of carrying the object from the near-point to the distant-point. When this condition has been reached, the strength of the "handicap-prisms" is to be increased say, to 25° or to 30°, and the method resumed as before. Before an adduction-power of 30° has been reached the symptoms of asthenopia will long have vanished, but the manifest, or the latent exophoria, will still usually, and to some degree, be present. The treatment with 30° to 40° prisms should be continued until all manifest and latent exophoria has disappeared, and 2° of esophoria have become manifest.

These, of course, are rough and indefinite rules, drawn from my short experience with the method, and they will require adaptation to the peculiarities of each case. Some patients have far greater reaction-power than others, both as to the amount of the "weighting" of the convergence-stimulus permissible or required, and as to

the rapidity of the return of normalization of innervation. But in all cases, so soon as increase of adduction-power has become stronger and habitual, we should weight the convergence-stimulus with still stronger prisms, so that effort and the device of slow recession of the object gazed at are (at first) required to avoid diplopia on looking at distant objects.

Since writing my first hurried article, my experience with the method has doubled. In no case has there been anything but the most gratifying success.

Many inquiries about the "battery of prisms" for testing adduction and abduction have been sent me. I have now given an optical firm a plan of a "double battery" that will, I am sure, be far superior to the old model. So soon as the instrument is completed I shall publish the design.